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(54) Reclosable container having anti-slip flanges facilitating opening and handling.

(57) A reclosable container features anti-slip flanges near the opening of the container to provide improved gripping surfaces on the container to assist the user during the opening, loading and unloading of the container.

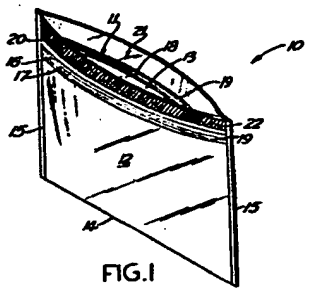

FIG.1

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RECLOSABLE CONTAINER HAVING ANTI-SLIP FLANGES FACILITATING OPENING AND HANDLING

Cross Reference To Related Application

This application is a continuation-in-part of my copending application Serial No. 361,188 filed March 24, 1982.

Background of the Invention

1. Field Of The Invention

This invention relates to a reclosable container having a closure fastening device, and more particularly, to such a reclosable container having anti-slip flange grasping surfaces which facilitate deocclusion of the closure fastening device for easier access to the container and to assist the user in holding the container during loading and unloading.

2. Discussion of the Prior Art

Generally, containers having closure fastening devices are well known in the art. U.S. Patent No. 4,212,337 to E.A. Kamp describes a type of reclosable container having a closure fastening device which can be improved by the instant invention.

The use of flexible reclosable containers is widespread and such are often used in homes for the storage of various items such as food. It is not uncommon that the opening of an occluded closure fastening device on a container is made somewhat more difficult by the smoothness of the flange grasping surfaces in the vicinity of the opening of the container. This is particularly a problem if the user has slippery fingers as a result of

handling greasy food or the like. In addition, difficulty in opening the closure may be aggravated due to limited flange grasping surface areas. Further, such closure fastening devices generally provide a secure, tight interlocking closure on the container making it difficult to deocclude the closure fastening device and open the container. Furthermore, the smoothness of the grasping surfaces near the opening of the container makes it somewhat more difficult to hold the open container during loading and unloading.

Various attempts have been made to overcome the aforementioned difficulties. For example, U.S. Reissue Patent No. 27,174 to Ausnit teaches the use of a raised bead at the edge of one of the flange grasping surfaces at the opening of the container to improve the accessibility to the container opening. This patent, however, does not teach nor suggest a construction which eliminates the gripping problem, especially for a user with slippery fingers. Additional flange surface area via widening one or more of the flanges would be helpful in opening the container, but such also contributes to the cost of the product. Providing an easier to deocclude closure fastening device would also be helpful in opening the container, but would jeopardize the integrity of the filled container. Therefore, a need exists for providing reclosable containers having interlocking fastening devices which may be opened with greater facility and held more securely while being loaded or unloaded.

Accordingly, it is an object of this invention to provide reclosable containers having interlocking fastening devices and anti-slip flange

grasping surfaces which facilitate the deocclusion of the fastening device by the user.

It is another object of this invention to provide reclosable containers having interlocking fastening devices which may be deoccluded with greater facility, especially when the user has slippery fingers, such as from handling moist or greasy foods.

It is a further object of this invention to provide reclosable containers which may be more firmly held by the user after deocclusion of the fastening device, such as during filling or discharging food products.

These objects, and others, will be more readily apparent from a reading of the following description and viewing the drawings of the invention.

Summary Of The Invention

In accordance with the present invention, there are provided reclosable containers having closure fastening devices wherein the reclosable containers have anti-slip flange grasping surfaces which facilitate deocclusion of the closure fastening devices of the containers. By providing low-slip, high-friction, grasping surfaces on the flange areas of the reclosable containers, opening and holding of the container is enabled with substantially less effort than with containers not so provided. Thus, by providing at least one non-smooth surface on at least one of the flange grasping areas of the reclosable container, the container is still highly resistant to opening

during normal handling while providing the user greater ease in opening and holding the container under adverse handling conditions. The anti-slip flange surfaces of this invention thus give the user a firmer grip in opening and holding the container.

In its broadest form, the invention comprises a container having a reclosable end, first and second sidewalls, and a closure fastening device including first and second closure profiles positioned on respective first and second sidewalls and operable for being occluded and disengaged with respect to each other to close and open the container, and features at least one non-smooth surface on at least one of the flange grasping areas of said reclosable container. More specifically, the first and second sidewalls are attached to each other along three sides and interlocking first and second closure profiles are located near the edge of the fourth side forming the container opening. The first and second closure profiles may be formed separately and then attached to the container sidewalls or they may be formed integral with the container sidewalls, as disclosed in U.S. Patent No. 4,212,337 to Kamp. Generally speaking, the improvement comprises rendering the surface of the flange areas to an anti-slip condition for improved gripping, thereby facilitating closure deocclusion and container handling during filling or discharging.

Brief Description Of The Drawings

FIG. 1 is a perspective view of an opened container in accordance with one embodiment of the invention;

FIG. 2 is a perspective view of an opened container in accordance with another embodiment of the invention;

FIG. 3 is a side elevational view of a typical closure fastening device and, on an enlarged scale, portions of flange grasping areas shown in FIG. 2 treated in accordance with the invention;

FIG. 3A is a side view of a coextrusion die opening showing molten plastic being fed through the middle channel to form the flange grasping area of a container.

FIG. 3B and FIG. 3C are top views of alternative slot extrusion die and annular extrusion die, respectively, that may have a coextrusion die structure as shown in FIG. 3A.

FIG. 4 is a schematic view of an apparatus for practicing one aspect of the invention;

FIG. 5 is an enlarged perspective view of an embossing roll shown in FIG. 4;

FIG. 6 is a perspective view of an embossed portion of a closure fastening device treated with the embossing roll shown in FIG. 5;

FIG. 7 is a side elevational view of a typical closure profile die for the extrusion of a portion of a closure fastening device in accordance with an embodiment of the invention;

FIG. 8 is an end view of the closure profile die depicted in FIG. 7 meeting with a flange forming extrusion die; and

FIG. 9 is a perspective view of part of a closure fastening device partially treated with anti-slip material in accordance with one aspect of the invention.

Description Of The Preferred Embodiments

In one preferred embodiment, the improved reclosable containers with interlocking fastening devices are provided by embossing or engraving at least one of the flange grasping surfaces of the interlocking fastening device. This may be accomplished, for instance, by replacing one of several rubber-covered pull rolls with a non-yielding engraved or embossed roll located downstream of a closure strip cooling means on a typical interlocking closure strip production line. The non-yielding roll or the rubber roll is provided with a groove therein to accommodate the closure profile and avoid damage thereto. In operation, the pressure of the nip action of the pull rolls embosses or engraves the anti-slip pattern into at least one of the flange grasping surfaces that is grasped to open the closure device on the reclosable container. In addition, the flange grasping areas may be embossed or engraved by passing them between a pair of matching rolls having an embossing or engraving pattern on their surface.

Thus, there is provided a zone or area on one or both closure fastening device flange grasping areas which is embossed, i.e., indented, corrugated, engraved, roughened or otherwise altered, to provide a non-slippery surface when grasping the container at its opening. The distortion of the otherwise smooth flange grasping areas may be accomplished in any convenient manner as by embossing the flange area with rolls, or otherwise, before, during or after, construction of the container. The distortions are preferably closely spaced and generally extend substantially perpendicular to the

plane of the treated flange area, but should be sufficiently spaced apart so that the strength properties of the flange areas are substantially retained. In forming the afore-described distortions, the individual distortions are spaced from their neighbors and the intervening areas of the flange remain in the initial smooth condition. Such smooth areas constitute a sufficient number so that the strength properties of the distorted flange area are substantially retained.

The distorted flange areas are preferably arranged in parallel rows with criss-crossed parallel rows arranged in diagonal fashion. The distortions provided may have any desired effective size, distribution and density, for example, in the range of between about 1 to about 1000 embossments, preferably 10 to about 100 embossments, per square inch of flange grasping area. The dimensions of the deformed areas of the flange and the depth of the embossments are likewise controlled so as to yield the most effective gripping results. Although not limited to a specific range, best results are generally attained when about seventy-five percent of the flange grasping area is embossed and has embossments having a depth of about 0.025 inch.

In another preferred embodiment of the instant invention, the improved reclosable containers with interlocking fastening devices are provided by placing a layer of an anti-slip material on at least one of the flange grasping areas of the reclosable container that are to be grasped for opening the container. This may be accomplished, for example, by adding an anti-slip material to the extrudate corresponding to the flange grasping areas

during extrusion. Alternatively, following extrusion, an anti-slip material may be embedded into this flange grasping area while it is still hot prior to cooling the flange. Still further, after cooling the flange, the flange may be reheated or softened by use of solvents therefor and the flange embedded with an anti-slip material. Further yet, an anti-slip coating may be applied to the flange grasping area. In addition, if desired a colorant such as a pigment or dye or mixture thereof may likewise be employed with the anti-slip material to provide a variety of colors to the treated flange grasping area.

The flange grasping areas of the container may be altered with an anti-slip material by either rendering or maintaining the flange area in a receptive state to provide a slip-resistant surface. Such may be accomplished by spraying or otherwise contacting the anti-slip material with the surface of the flange area of the container by maintaining the particles of anti-slip material above the melting point of the flange area or by maintaining the flange area in a molten state.

The anti-slip material on the surface of the flange grasping area of the container may be in the form of a substantially continuous or discontinuous layer in the sense that the particles may be closely adjacent to each other or they may be distributed in a random fashion.

The anti-slip material employed in this embodiment may be any suitable material. Typical anti-slip materials include granular or powdered calcium carbonate, fine quartz sand, grit, starch, silica, talc, latex, particulated polymers such as

polyvinyl chloride, and blended polymers such as polyvinylidene chloride-polyacrylonitrile, or polyvinylidene chloride-polymethyl methacrylate.

The anti-slip material should have a particle size in the range of between about 1 micron and about 50,000 microns, preferably between about 500 microns and 10,000 microns. The anti-slip material also should preferably be a solid, particulate material substantially uniformly applied to at least one surface of the flange grasping area of the container.

The amount of anti-slip material incorporated on the surface of the flange may comprise from between about 0.2 percent to about 50 percent by weight of the altered grasping flange of the container.

The containers and closure fastening devices employed in this invention may be prepared from any suitable packaging material. Typical packaging materials include polymeric materials, preferably those such as polyethylene, polypropylene, polyvinyl chloride, polyvinyl acetate, polyamides, polyvinylidene chloride, and mixtures or copolymers thereof. Where the anti-slip material is applied to the flange grasping area of the closure fastening device while the closure fastening device is in a molten state such as when the fastening device is formed by melt extrusion, the anti-slip material may conveniently be applied to the polymeric material surface before it solidifies on cooling. The particles of anti-slip material become partly embedded in the surface of the polymeric material so that when the polymeric

material solidifies, the particles are held in position on the face thereof.

Other preferred embodiments of the present invention feature the sidewalls of the reclosable container being either transparent, translucent or opaque and the grasping flanges being colored to be easily recognized visually with respect to the sidewalls.

In carrying the invention into effect, several embodiments have been selected for illustration in the accompanying drawings and for description in this specification, reference being had to FIGS. 1 to 9.

FIG. 1 shows a perspective view of a container 10 with opening 11 . The container 10 has sidewalls 12 and 13 which are typically thin, flexible, transparent plastic film which has been folded along bottom edge 14 and heat sealed along vertical side edges 15 to define a pouch or bag.

The container 10 includes a closure fastening device 16 such as described in the aforementioned U.S. Patent No. 4,212,337. The closure device 16 includes closure profiles 17 and 18 which can be occluded and disengaged with respect to each other for closing and opening the container 10. Closure profiles 17 and 18, in the form of a closure tape are attached to the interior of sidewalls 12 and 13 along sidewall seal areas 19. Container 10 also includes grasping flanges 20 and 21, with a grasping surface 22 on flange 20.

It can be seen from FIG. 1 that the use of transparent sidewalls 12 and 13 results in the visual recognition that there is an altered flange grasping surface 22 on the container 10.

In FIG. 1, an anti-slip flange grasping surface 22 has been provided to grasping flange 20 by passing the flange grasping surface between a pair of rolls at least one of which bears an embossing or engraving pattern on its outer surface.

In FIG. 2, anti-slip flange grasping surfaces 23 and 24 have been provided by adding an anti-slip material to grasping flanges 20 and 21.

FIG. 3 shows the relative positions of anti-slip grasping outside surface 23 and inside surface 24 shown on FIG. 2 with respect to the closure profiles 17 and 18.

FIG. 3A, 3B and 3C relate to the form of a slot and an annular die either of which can be used to form an integral reclosable container with anti-slip flanges.

In FIG. 3A, anti-slip material from a supply source or reservoir 25 may be coextruded onto both faces of a flange grasping surface emanating from flange grasping material feed inlet 26. The anti-slip material is shown joining the flange grasping material feed just before the die lip 27. However, it may also be merged therewith earlier or right at the lip opening. FIG. 3B depicts a slot die opening used to form integral closure elements on a film or sheet to form a container. As shown therein, slot film die opening 28 extrudes a film or sheet having attached thereto a male closure element formed by opening 17' and a female closure element formed by opening 18', and adjacent to the closure elements are a plurality of die sections 22' which form flange grasping surfaces coated with an anti-slip material. FIG. 3C shows an annular die to form a container wherein annular opening 29 extrudes

a film, and openings 17" and 18" extrude a male closure element and a female closure element, respectively, and die sections 22" form a plurality of flange grasping surfaces. After cooling, the extruded film with integral closure elements is slit in the area of the designated section line 30, and employed to form an interlocking closure container stock which is then sever-sealed to form interlocking closure containers.

FIG. 4 shows a schematic view of apparatus for continuously embossing or engraving the flange grasping area of part of a closure fastening device or a reclosable container stock. There is shown a reclosable container stock supply 31 (source not shown) or a closure fastening tape supply 31 (source not shown) being fed to the nip of two pull rollers wherein one roller is a resilient rubber-backed roller 32 and one roller is a non-yielding embossing roller 33 having on its surface an embossing pattern 34 on one portion thereof as shown in FIG. 5. Embossing roller 33 also has a peripheral groove 35, as shown in FIG. 5, located around its circumference to accommodate the closure profile element and to avoid damage to the closure profile. The other portion of the embossing roller is smooth as depicted at surface 36 in FIG. 5. As shown in FIG. 4, container stock supply 31 or tape supply 31 is fed to the nip of rubber-backed roller 32 and embossing roller 33 whereby an embossed pattern is produced on part of reclosable container stock supply 31 or closure fastening tape supply 31. An embossed pattern 37 on closure fastening tape 31 is shown in FIG. 6, and is provided on one side of fastening tape 31. Closure profile 18 and an inner

flange area 19' of closure fastening tape 31 are not distorted by the rollers.

As shown in Figure 4, anti-slip flange surface areas are provided by feeding reclosable container stock or closure tape having smooth flange areas, between the nip of a pair of rollers wherein at least one of the rollers bears an embossing or engraving pattern thereon, and one or both rollers have grooves therein to accommodate the occludable profile elements of the interlocking fastener device to thus avoid damaging the occludable elements.

Following the embossing step, the male and female closure elements may be occluded by passing through occlusion rollers and the occluded container stock or closure tape is then directed to a wind-up device for storage, or is directed to further processing equipment.

In FIG. 7 is shown a side elevational view of a melt extrusion die apparatus 38 for the practice of one embodiment of the invention. Polymeric raw material is introduced into a closure profile melt feed reservoir 39 and extruded through a closure shaped flow channel 40. Reservoir 41 is fed with anti-slip material which feeds to transfer channel 42 and then supplies slot combining region 43. In FIG. 8, flange forming die 44 has a feed reservoir 45 for melted polymer to form the closure flange. Reservoir 41 feeds anti-slip material into transfer channel 42 of die 38. In region 43, it is seen that the anti-slip material joins with the closure flange material. On leaving extrusion exit 47, and after cooling, the partial closure tape has

one smooth flange side 48 as shown in FIG. 9, a closure profile element 18, and a flange side 49 partly altered with anti-slip material.

As earlier indicated, the improved reclosable containers of this invention are provided with anti-slip flange surface areas for gripping by the user, thereby enabling easier opening and holding of the container. The anti-slip flange surface areas may be provided by embossing or engraving the flange area to be grasped or by placing an anti-slip material on or in the flange area to be grasped for opening the container.

Generally speaking, the anti-slip surfaces should be located above the closure fastening device near the container opening for satisfactory performance in practicing the invention. Preferably, the anti-slip surfaces are located on both inside and outside grasping surfaces of the container opening, although they may be located on just the inside, just the outside, or any combination of the inside and outside grasping surfaces of the container. Further, it is not necessary for all of the flange areas of the grasping surface to have the same corresponding dimensions or the same type flange treatment.

The best mode of embodiment of the invention is as follows: Sidewalls 12 and 13 are clear, flexible polyethylene film and the closure fastening device 16 is the type disclosed in the aforementioned U.S. Patent No. 4,212,337 and as shown in FIG. 1 herein.

Typically, the container 10 width is about 10 9/16 inches and the height is about 11 1/2 inches. The closure fastening device 16 is located

about 5/8 inch below the top edge of the grasping flanges. The anti-slip surfaces start at about 1/8 inch from the closure profiles and extend therefrom, preferably all the way to the flange edge. The anti-slip surfaces are translucent, closure profile 18 is clear, and closure profile 17 is colored blue.

The operation of the container according to the invention is as follows.

A user in the process of opening the container 10 with occluded profiles 17 and 18 can easily separate the top edges of the grasping flanges 20 and 21 by stroking his thumb across the top edges of the grasping flanges. The relatively small spacing between the flange areas enables the user to engage the anti-slip surface as a result of this stroking of the top edges of the grasping flanges. The anti-slip surface results in an excellent gripping surface, even for a user with slippery fingers and where the container is made from a slippery film material. The user proceeds to separate the top edges of the grasping flanges from each other by spreading them apart to disengage the closure profiles 17 and 18 from each other.

The opening of the container 10 involves three operative forces which are of interest. In addition to the spreading force, the user exerts squeezing forces on the anti-slip flange surface 22 to produce frictional forces which will prevent flange 20 from slipping from the user's fingers. In addition, the user exerts squeezing forces on anti-slip flange surface 22 to prevent the container 10 from slipping from the user's fingers when the container 10 is being loaded or unloaded.

The anti-slip flange surface 22 drastically reduces the squeezing forces needed by the user, especially if the user has slippery fingers or where the container is made from a slippery film material.

The containers and closure fastening devices employed in this invention may be prepared by any suitable manufacturing method. For example, each closure fastening device can be manufactured as a strip for subsequent attachment to a film by the use of appropriate means. Typically, a thermoelectric device can be used to apply heat to a film in contact with a closure strip to cause a transfer of heat through the film to produce fusing at the interface of the film and the closure strip. The fusing of the film and the closure strip may also be established by the use of hot melt adhesives, hot air sealing, or other methods such as ultrasonic heating.

However, it is preferred that a method for producing plastic film with occludable closure strips fused thereto be employed as disclosed in my copending application U.S. Serial No. 361,191, filed on March 24, 1982. The operation of said invention, broadly speaking, involves adhering an interlocking closure strip, which is in a non-molten state, to a molten film of thermoplastic material. The process is continuous and employs a slot film casting station and at least one grooved lay-on roll. In one embodiment, interlocking closure strips having profile portions and flange portions are fed to lay-on rolls having circumferential grooves therein to accommodate the contours of the profiles of the closure strips. A molten plastic film is extruded onto a rotatable casting cylinder positioned

opposite the lay-on rolls so that the plastic film becomes fused to the flange portions of the closure strips, and thereafter the combination of plastic film and closure strips is cooled. The lay-on rolls, in this embodiment, are each only as wide as the specific closure strip to be laminated with the molten thermoplastic film, and normally do not contact the molten thermoplastic film. Further, the lamination pressure exerted by the lay-on rolls on the casting cylinder, with the closure strips and molten plastic film therebetween, may be controlled by spacing means such as jacking bolts or air cylinders which prevent damage to the profile portions of the closure strips and the molten plastic film. The casting cylinder is rotated at substantially the same surface speed as the fed closure strips, whereby the closure strips are laminated to the film of molten thermoplastic material cast on the casting cylinder. The combination of closure strips and plastic film is then advanced to further cooling means such as a chill roll.

The afore-described method for providing plastic film with occludable closure strips fused thereto, pursuant to my copending application, U.S. Serial No. 361,191 filed on March 24, 1982, may be employed herein to provide the sidewalls of the container with at least one anti-slip surface such as grasping surface 22 near the end edge of sidewalls 12 and 13, as shown in FIG. 1. The anti-slip surface on said grasping area may be obtained by providing an embossing or engraving pattern on at least one portion of the aforementioned plastic film casting cylinder,

feeding preformed interlocking closure strips having profile portions and flange portions to a rotatable circumferentially grooved lay-on roll so that the unoccluded profile portions of the closure strips extend into the grooves of the lay-on roll, extruding a molten plastic film onto the rotatable casting cylinder positioned opposite the lay-on roll so that the molten plastic film fuses to the flange portions of the closure strips, and thereafter cooling the laminated composite of plastic film and closure strips.

The embossing or engraving pattern on at least one portion of the surface of the casting cylinder may be one as earlier discussed and depicted in Fig. 5 for embossing roller 33 at element 34. The other portion of the surface of the casting cylinder can be smooth. In addition, the surface of the casting cylinder may have more than one portion thereof having an embossing or engraving pattern thereon. In any event, as the molten plastic film is extruded onto the casting cylinder having an engraving or embossing surface portion, and as the molten plastic film contacts the closure strips carried by the lay-on roll, pressure contact therebetween fuses the cast molten plastic film to the closure strips and also embosses the opposite surface of the cast film to provide anti-slip grasping areas thereto.

As shown in Fig. 5 herein with respect to embossing roller 33, the engraving or embossing pattern on the surface of the casting cylinder is preferably closely spaced and has intervening smooth areas. The engraving or embossing pattern on the surface of the casting cylinder is likewise

preferably arranged with criss-crossed parallel rows in diagonal fashion, and preferably provides from between about 10 to about 100 embossments per square inch as depicted on surface 37 in Fig. 6.

The method may also employ slitters to remove trim such as edge beads and to slit the laminate to provide multiple products having closures. For example, a pair of deoccluded interlocking closure strips may be fed into the grooving of a plurality of rubber-covered lay-on rolls which align the strips into the proper lateral positions prior to contact and lamination with the molten cast thermoplastic film. Obviously, any number of such lay-on roll arrangements may be employed on a common shaft.

Various alternatives may be practiced pursuant to this invention. For example, each closure strip portion may be extruded directly, into the area previously described as the lamination area, simultaneously with the cast thermoplastic film while providing appropriate cooling means therefor. These molten plastic streams are combined to form an integral plastic web which is then cooled and processed further. As in the afore-described method, the casting cylinder may be provided with an embossing or engraving pattern on a portion of its surface and produce an anti-slip surface to a grasping area of the ultimate container. Preferably, at least a portion of the casting cylinder has a matte, textured, embossed, or engraved surface to provide the desired anti-slip grasping areas for the reclosable container. The

container stock may also be fed directly to a container forming/cut-off mechanism such as a bag-making machine.

Containers prepared in accordance with this invention may be used in the packaging and storing of a variety of products. Moisture-containing comestibles including fruit such as apples, pears, peaches, plums, tomatoes; meats; vegetables such as carrots, peas and string beans may be conveniently packaged and maintained in sanitary condition in such containers.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for various modifications will occur to a person skilled in the art, in view of the foregoing disclosure.

Having described the invention, what I claim as new and desire to be secured by Letters Patent is as follows:

CLAIMS:

1. In a container having a reclosable end, comprising respective first and second sidewalls, and a closure fastening device including first and second closure profiles positioned on said respective sidewalls and operable for being occluded and disengaged with respect to each other to close and open said container, each of said sidewalls having a grasping area near the end edge thereof, the improvement which comprises at least one of said grasping areas having an anti-slip surface.

2. The container of claim 1 wherein said closure profiles are each connected to the surface of a closure tape attached to said respective sidewalls.

3. The container of claim 2 wherein said closure tapes are colinearly positioned with and attached near the edges of the reclosable end of said container.

4. The container of claim 1 wherein said anti-slip surface comprises an embossed pattern.

5. The container of claim 4 wherein said embossed pattern has been provided by passing said grasping area between a non-yielding embossing roller and a roller having a yielding surface.

6. The container of claim 4 wherein said embossed pattern has been provided by passing said grasping area between a pair of matching rolls having an embossing pattern on their surface.

7. The container of claim 4 wherein said embossed pattern is present in the form of between about 1 to about 1,000 embossments per square inch of said anti-slip surface.

8. The container of claim 1 wherein said anti-slip surface comprises particulate material.

9. The container of claim 8 wherein said particulate material is present as a layer.

10. The container of claim 9 wherein said layer is substantially continuous.

11. The container of claim 9 wherein said layer is a discontinuous layer.

12. The container of claim 8 wherein said particulate material is embedded in said grasping area.

13. The container of claim 12 wherein said particulate material is embedded in said grasping area as a substantially continuous layer.

14. The container of claim 12 wherein said particulate material is embedded in said grasping area as a discontinuous layer.

15. The container of claim 8 wherein said particulate material is selected from the group consisting of calcium carbonate, sand, grit, starch, silica, talc, and mixtures thereof.

16. The container of claim 8 wherein said particulate material is selected from the group consisting of polyvinyl chloride, polyvinylidene

chloride, polyacrylonitrile, polymethyl methacrylate, and mixtures thereof.

17. The container of claim 8 wherein said anti-slip material has a particle size in the range of between about 1 micron and about 50,000 microns.

18. In a process for making a container having a reclosable end, respective first and second sidewalls, and a closure fastening device including first and second closure profiles positioned on said respective sidewalls and operable for being occluded and disengaged with respect to each other to close and open said container, each of said sidewalls having a grasping area near the end edge thereof, the improvement which comprises providing at least one anti-slip surface on at least one grasping area.

19. The process of claim 18 wherein said anti-slip surface is provided by passing said grasping area between a non-yielding embossing roller and a roller having a yielding surface.

20. The process of claim 18 wherein said anti-slip surface is provided by passing said grasping area between a pair of matching rolls having an embossing pattern on their surface.

21. The process of claim 18 wherein said anti-slip surface is provided by embedding particulate material in said grasping area.

22. A process for making a closure fastening device in a closure tape form having flange grasping areas with an anti-slip surface comprising passing said flange grasping areas

between a non-yielding embossing roller and a roller having a yielding surface.

23. A process for making a closure fastening device in a closure tape form having flange grasping areas with an anti-slip surface comprising passing said flange grasping areas between a pair of matching rolls having an embossing pattern on their surface.

24. A process for making a closure fastening device in a closure tape form having flange grasping areas with an anti-slip surface comprising extruding a closure fastening tape having occludable closure elements and flange areas on both sides of said closure elements, contacting at least one of said flange areas while in a softened condition with a particulate material, and cooling said closure fastening device so that said particulate material is embedded in at least one of said flange grasping areas.

25. A process for making a container having a reclosable end, respective first and second sidewalls, and a closure fastening device including first and second closure profiles positioned on said respective sidewalls and operable for being occluded and disengaged with respect to each other to close and open said container, each of said sidewalls having a grasping area near the end edge of said sidewalls, said process comprising advancing occludable closure strips having profile portions and flange portions to a rotatable circumferentially grooved lay-on roll so that unoccluded profile portions of said closure strips extend into the

grooves of said lay-on roll, extruding a molten plastic film onto a rotatable casting cylinder having an embossing pattern on at least one portion of the surface of said casting cylinder wherein said casting cylinder is positioned opposite said lay-on roll so that said molten plastic film fuses to said flange portions of said closure strips and said molten plastic film is provided with an embossed pattern by applying pressure between said lay-on roll and said casting cylinder, and cooling said plastic film and closure strips, whereby said grasping area is provided with at least one anti-slip surface comprising said embossed pattern.

26. The process of claim 25 including controlling the pressure applied between said lay-on roll and said casting cylinder.

27. The process of claim 25 wherein said pattern on the surface of said casting cylinder provides from between about 1 to about 1000 embossments per square inch.

28. A process for making a container having a reclosable end, respective first and second sidewalls, and a closure fastening device including first and second closure profiles positioned on said respective sidewalls and operable for being occluded and disengaged with respect to each other to close and open said container, each of said sidewalls having a grasping area near the end edge of said sidewalls, said process comprising advancing occludable closure strips having profile portions and flange portions to rotatable circumferentially grooved lay-on rolls so that unoccluded profile

portions of said closure strips extend into the grooves of said lay-on rolls, extruding a molten plastic film onto a rotatable casting cylinder having an embossing pattern on at least one portion of the surface of said casting cylinder wherein said casting cylinder is positioned opposite said lay-on rolls so that said molten plastic film fuses to said flange portions of said closure strips and said molten plastic film is provided with an embossed pattern by applying pressure between said lay-on rolls and said casting cylinder with said closure strips and plastic film therebetween, and cooling said plastic film and closure strips, whereby said grasping area is provided with at least one anti-slip surface comprising said embossed pattern.

29. The process of claim 28 including controlling the pressure applied between said lay-on rolls and said casting cylinder.

30. The process of claim 28 wherein said pattern on the surface of said casting cylinder provides from between about 1 to about 1000 embossments per square inch.

31. A process for making a container having a reclosable end, respective first and second sidewalls, and a closure fastening device including first and second closure profiles positioned on said respective sidewalls and operable for being occluded and disengaged with respect to each other to close and open said container, each of said sidewalls having a grasping area near the end edge of said sidewalls, said process comprising extruding said first and second closure profiles simultaneously

with a thermoplastic film cast onto a rotatable casting cylinder having an embossing pattern on at least one portion of the surface of said casting cylinder, combining said closure profiles and said thermoplastic film so that said thermoplastic film and said closure profiles fuse together and said thermoplastic film is provided with an embossed pattern, and cooling said thermoplastic film and closure profiles to provide at least one anti-slip surface to a grasping area of said thermoplastic film.

0089680

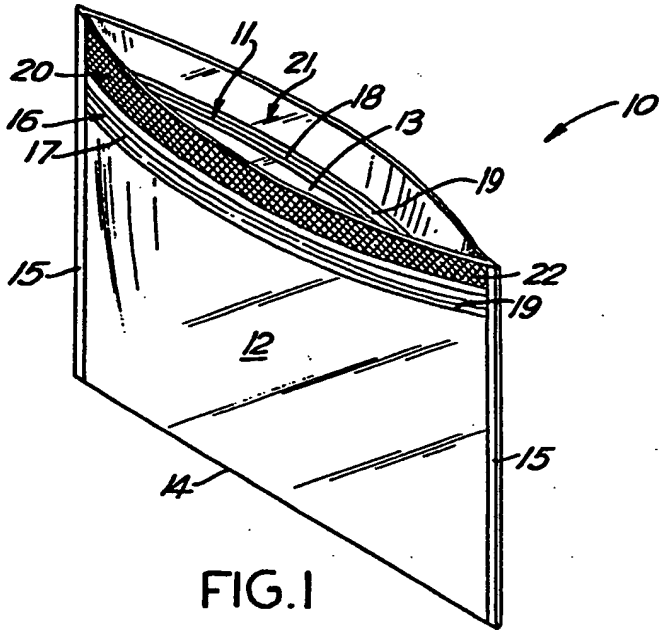

FIG.1

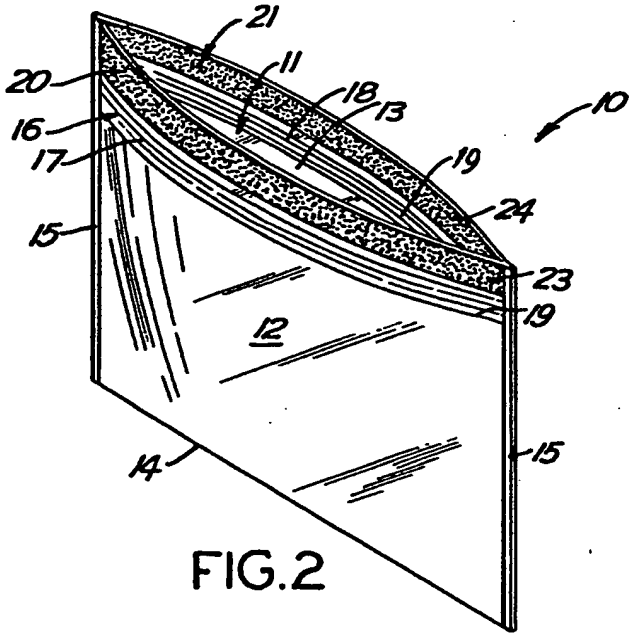

FIG.2

0089680

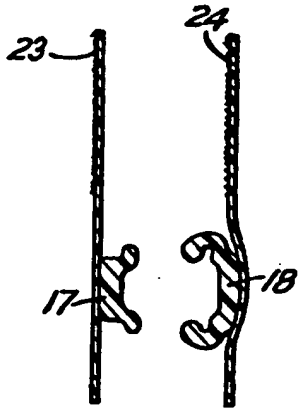

FIG.3

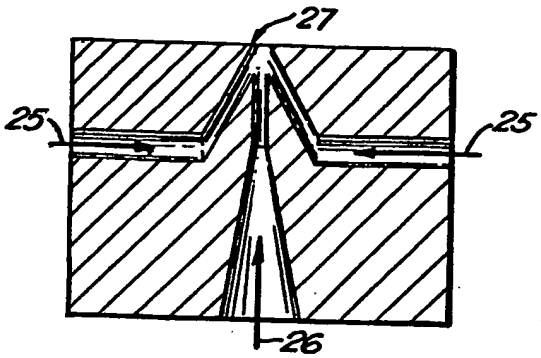

FIG.3A

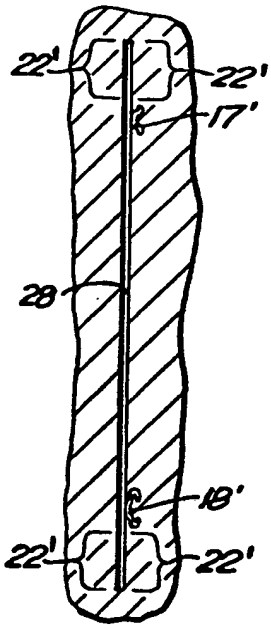

FIG.3B

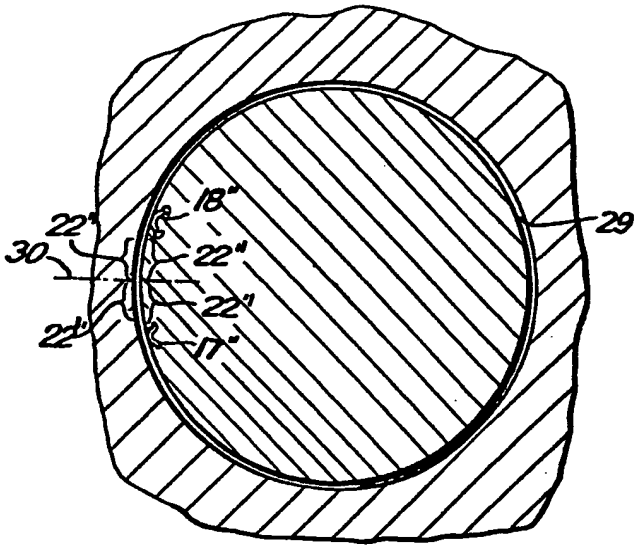

FIG.3C

0089680

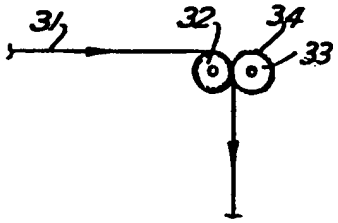

FIG.4

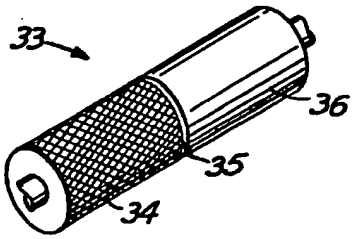

FIG.5

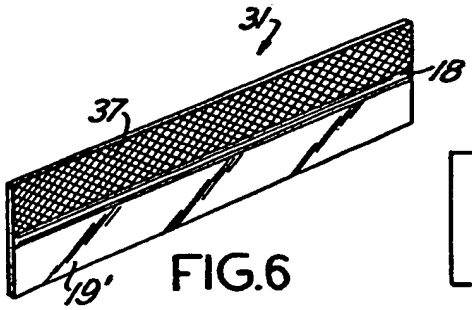

FIG.6

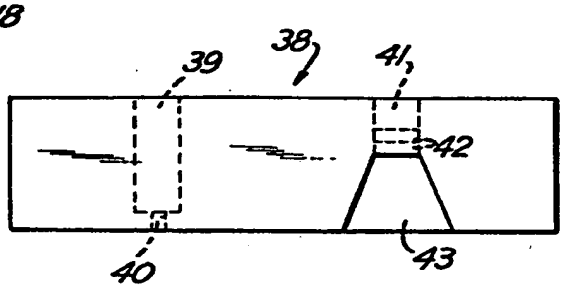

FIG.7

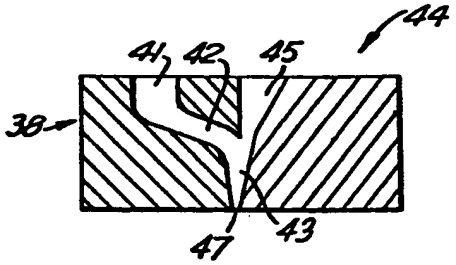

FIG.8

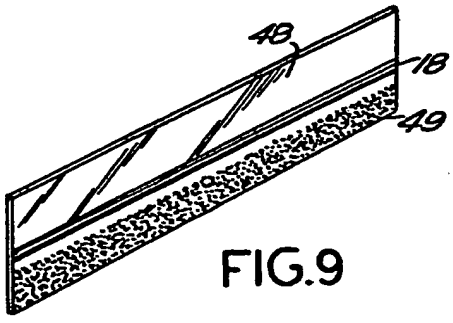

FIG.9